

Sub A17

WHAT WE CLAIM IS:

1. A gas laser apparatus emitting ultraviolet radiation, comprising:

a laser chamber;

5 a magnetic pulse compression circuit; and

a pair of laser discharge electrodes connected to output terminals of said magnetic pulse compression circuit and disposed in said laser chamber;

10 wherein a laser oscillating operation is performed by a first half-cycle of a discharge oscillating current waveform of one pulse in which a polarity is reversed, together with at least one half-cycle subsequent to the first half-cycle.

2. A gas laser apparatus emitting ultraviolet radiation according to claim 1, which is an ArF excimer laser apparatus, wherein said magnetic pulse compression circuit has:

a series circuit including a first magnetic switch and a first capacitor;

20 a second capacitor connected to both ends of said series circuit; and

a second magnetic switch connected at one end thereof to a junction between said first magnetic switch and said second capacitor;

25 wherein the other end of said second magnetic switch and the other end of said second capacitor constitute said output terminals;

wherein when a capacitance of said second capacitor

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is 12 to 16 nF, and a capacitance of a peaking capacitor of said laser apparatus that is connected between said output terminals in parallel to said pair of laser discharge electrodes is 10 to 16 nF, and further an inductance of a circuit loop formed by said peaking capacitor and said pair of laser discharge electrodes is 5 to 8 nH, and further a distance between said pair of laser discharge electrodes is 15 to 20 mm, and further a partial pressure of fluorine in said laser chamber is less than 0.12% of a total pressure of a laser gas,

a rise time required for a voltage applied between said pair of laser discharge electrodes to reach a voltage at which breakdown occurs is not more than 80 ns.

3. A gas laser apparatus emitting ultraviolet radiation according to claim 2, wherein the voltage at which breakdown occurs between said pair of laser discharge electrodes is from 18 to 28 kV, and said rise time of the voltage is not less than 40 ns.